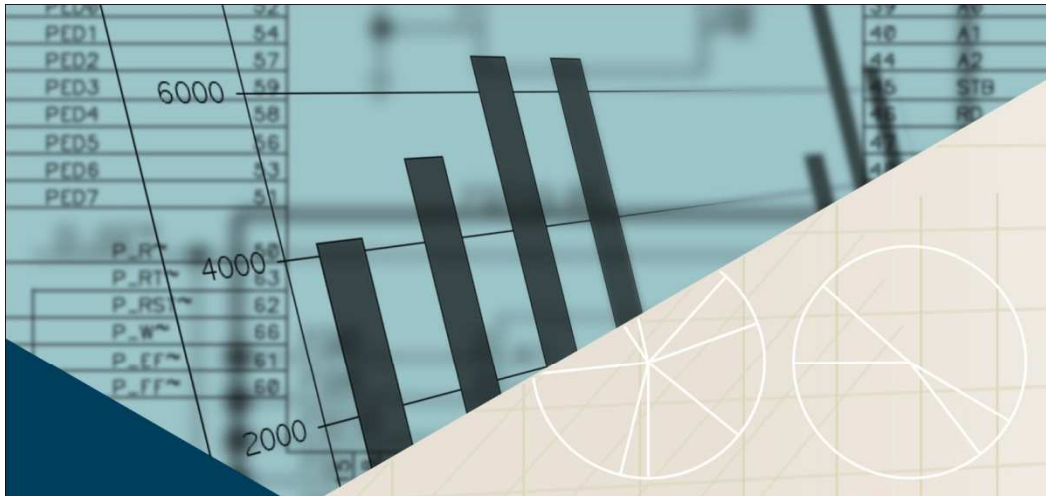

Knowing where events are going to happen

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CAS Fall Meeting - November 2013

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Session Objectives

- What determines the short term vs long term frequency?
- Geographical accuracy
  - Models predict where the events are more likely to occur
  - Geocoding accuracy – understanding granular data
- Validation of recent history of events
  - Hail
  - Tornado
  - Wildfire
- Combination of multiple perils – Single Risk Score

Understanding where events can happen

- What affects the short term frequency of events?
  - Climate change – frequency of events and geographic distribution
  - Solar activity
  - Heat – sunk in the earth, stored in oceans
  - Drought conditions / Abundance of precipitation
  - Time elapsed since last event
  - Random variation

- It's almost impossible to predict exactly when and where the next event is going to happen
  - But if you can predict the locations with the highest risk for an event, isn't that just as much or more important for setting a natural catastrophe plan/strategy?

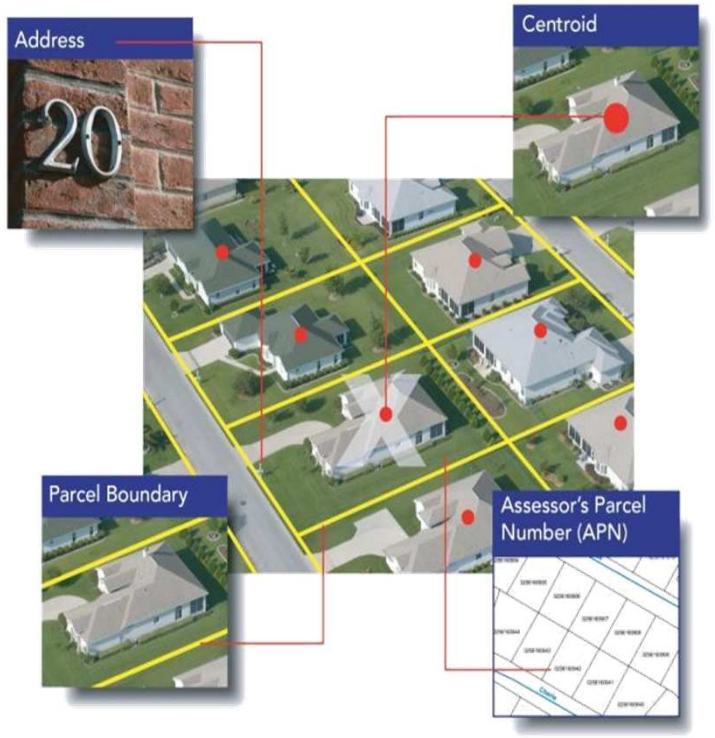
Knowing where events are going to happen

- Scientists gather information on the both short/long term factors that increase/decrease the likelihood of natural catastrophic events
- Models are developed that set a risk level for every location across the US – extremely granular (10 meter grids)
- Revisions are made annually to adjust for more recent information (ie vegetation changes / drought conditions for Wildfires)
- Ongoing validation on the accuracy of the models by comparing where recent events have occurred to the estimated risk levels
  - Do the actual events in fact occur in the higher risk areas that we expected?

The importance of granularity

What is Parcel Data?

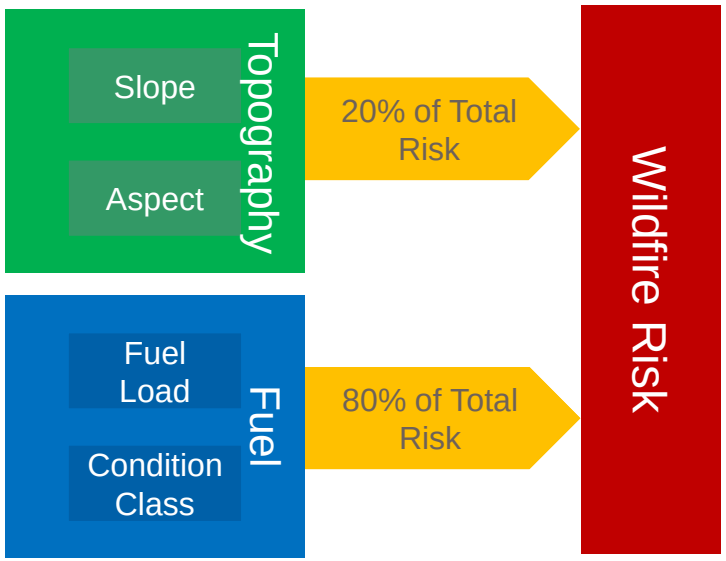
- Parcel boundary data represents the legal extents of each taxable U.S. property address.
- There are an estimated 144.3 million privately owned parcels in the U.S.
- CoreLogic has converted and normalized about 137 million parcels from state, county, city, and town sources
- As these digital parcel boundaries become available they are rapidly being incorporated into applications to enhance:
  - Geocoding accuracy
  - Risk assessment
  - Risk concentration
  - Many other uses where “granular” accuracy is important



Wildfire Risk Determination

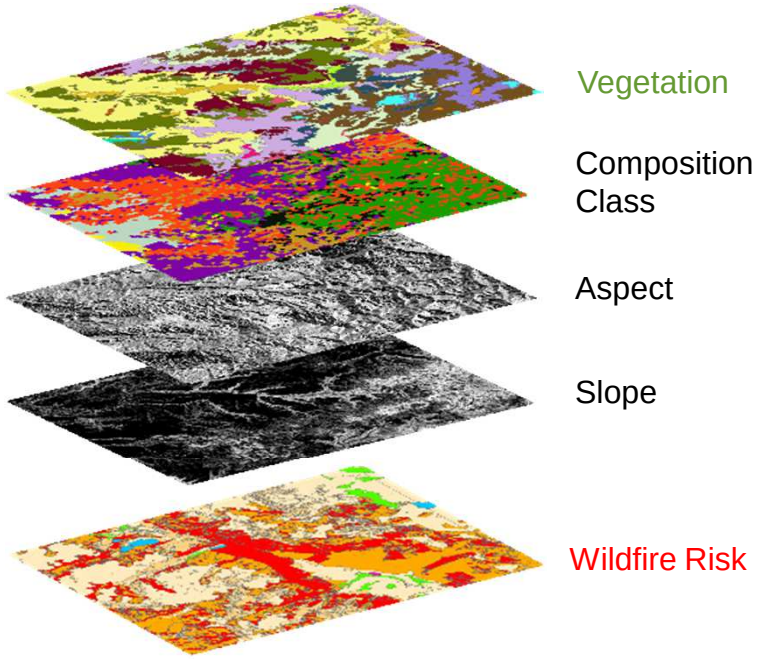
Data Elements

- Digital Elevation Model (DEM)
- Satellite Imagery
- Vegetation Condition Class data



Data Granularity

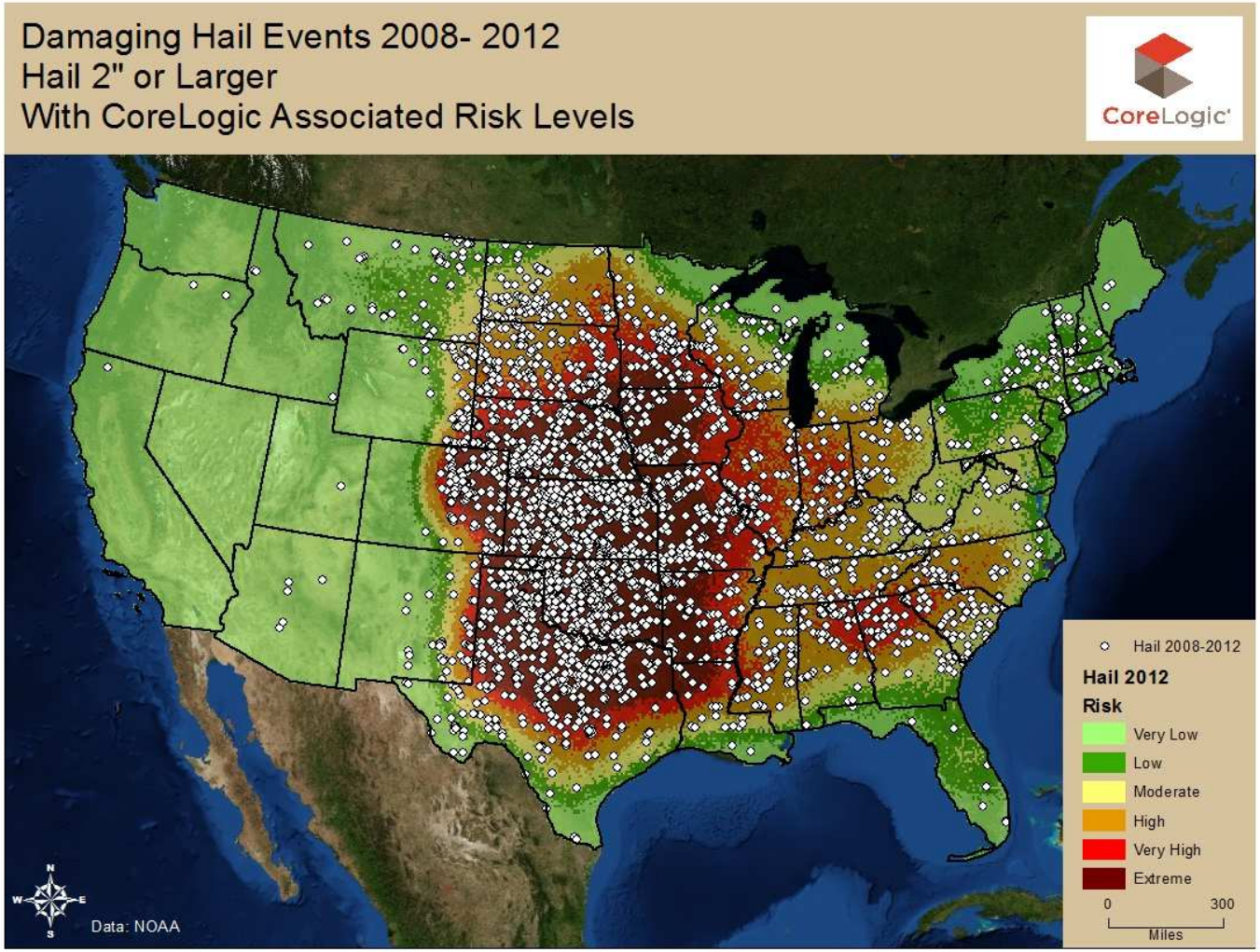
- Input cell size based on 30m grid
- All layers sampled at 30m



Severe Convective Storms (SCS)

- Severe Convective Storms (SCS) refer to Tornado, Hail and Straight Line Wind events
- Prior to recent events, less attention given to SCS vs Hurricane and Earthquake
  - Tornados and the storms that generate tornados account for more than half of the insured catastrophic losses (57%) that occur each year in the U.S. – and extend beyond “Tornado Alley”
- Frequency of observed events has increased
  - Growing population
  - Better observational tools (Doppler radar, etc.)
  - Rising global temperature

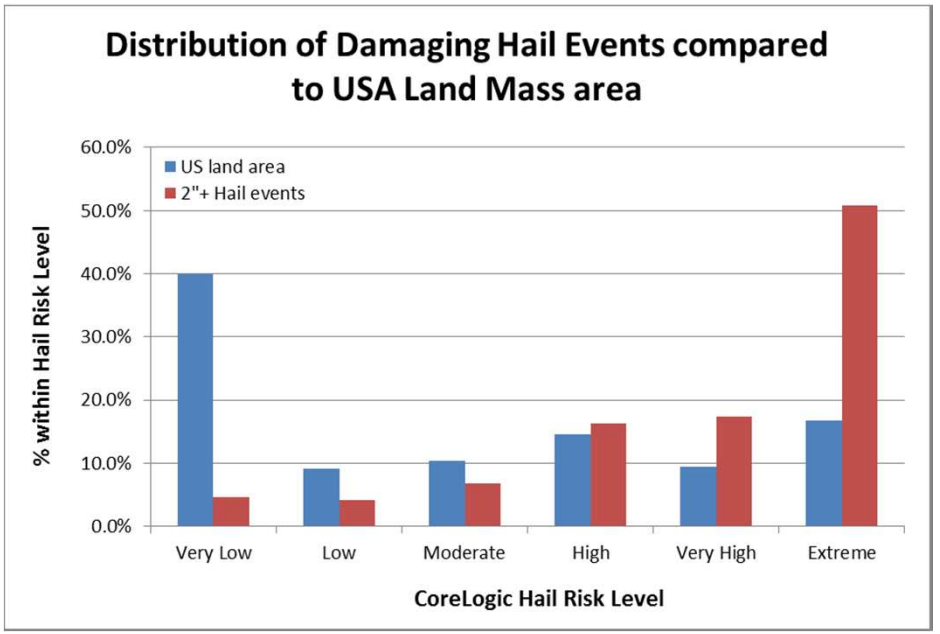
Damaging Hail Events 2008-2012



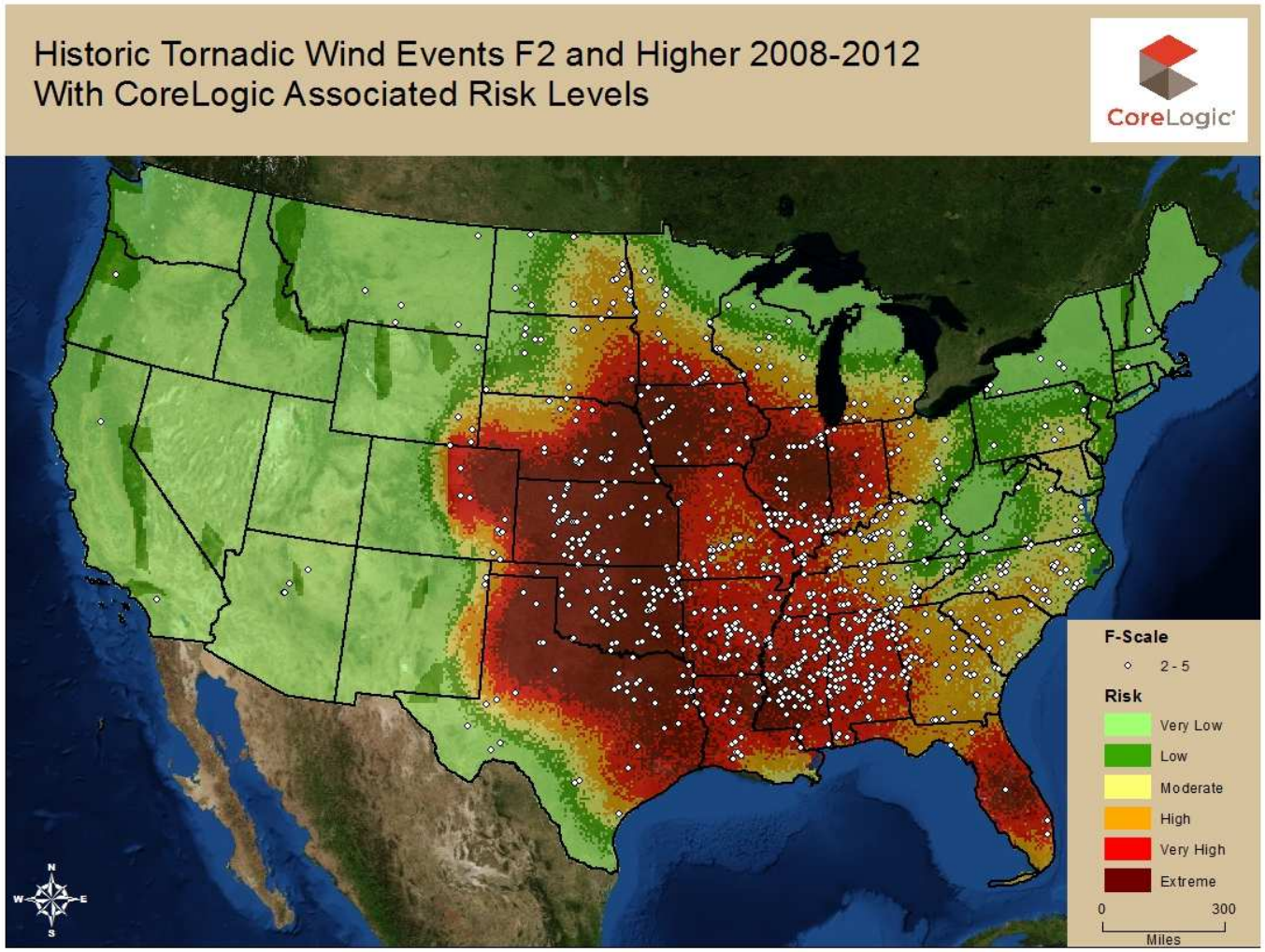
Distribution of 2”+ Hail events

- 50.9% of Damaging Hail events occur in areas with Extreme Hail Risk levels
- 84.5% of Damaging Hail events occur in areas of High, Very High or Extreme Hail Risk; those areas are only 40.8% of the land area of the USA.

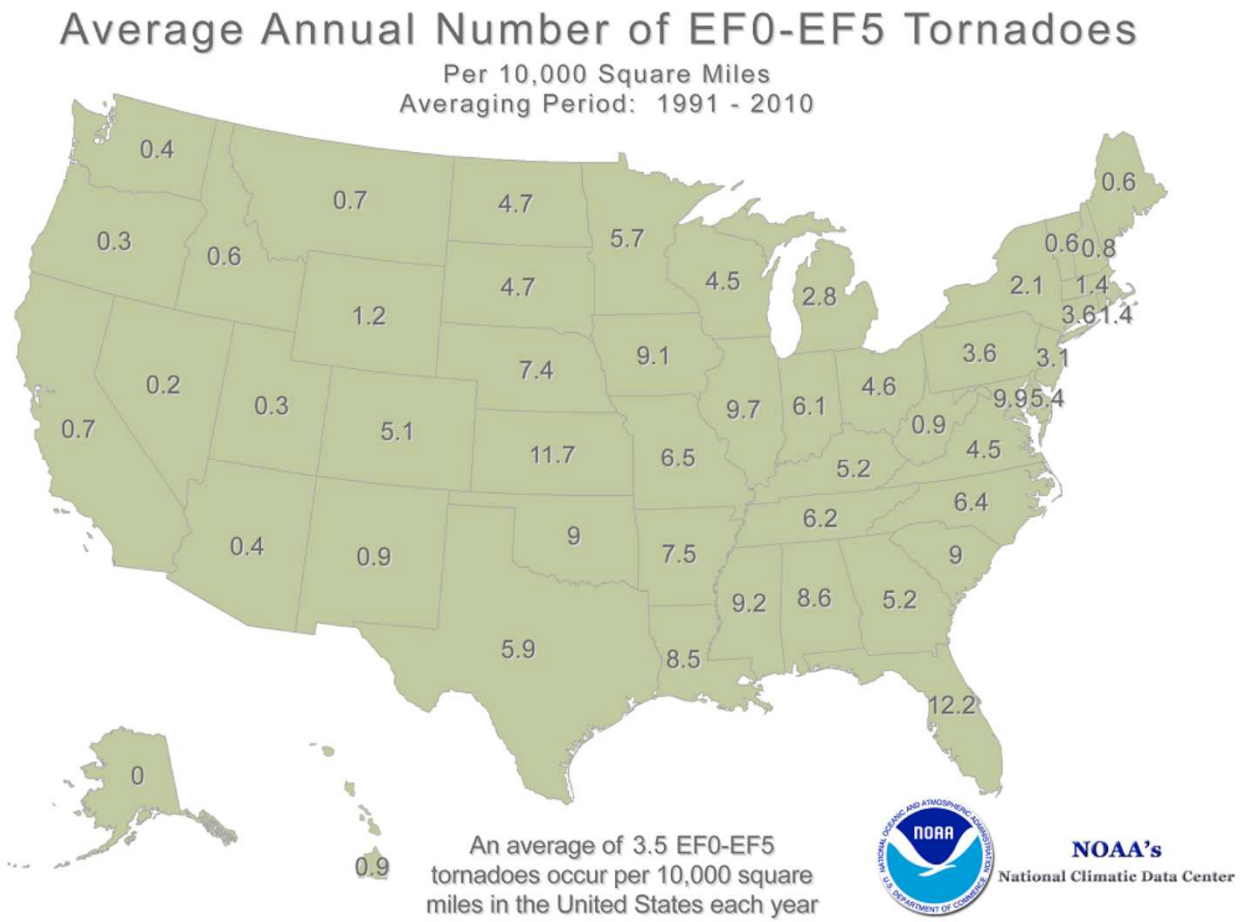
Risk Level	USA Land Mass Area	2"+ Hail Events
Very Low	39.8%	4.6%
Low	9.1%	4.1%
Moderate	10.3%	6.8%
High	14.6%	16.2%
Very High	9.5%	17.4%
Extreme	16.7%	50.9%



Historic Tornadic Wind Events



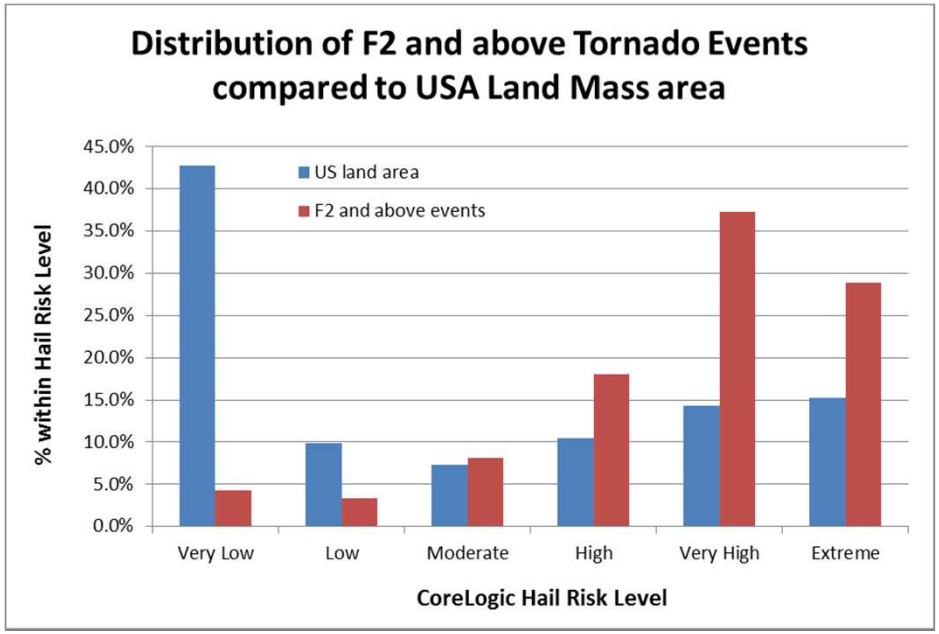
Annual EF0-EF5 Tornadoes



Distribution of F2 and above Tornado events

- 28.9% of F2 and higher events occur in areas with Extreme Tornado Risk levels
- 84.2% of F2 and above events occur in areas of High, Very High or Extreme Risk; those areas are only 40.0% of the land area of the USA.

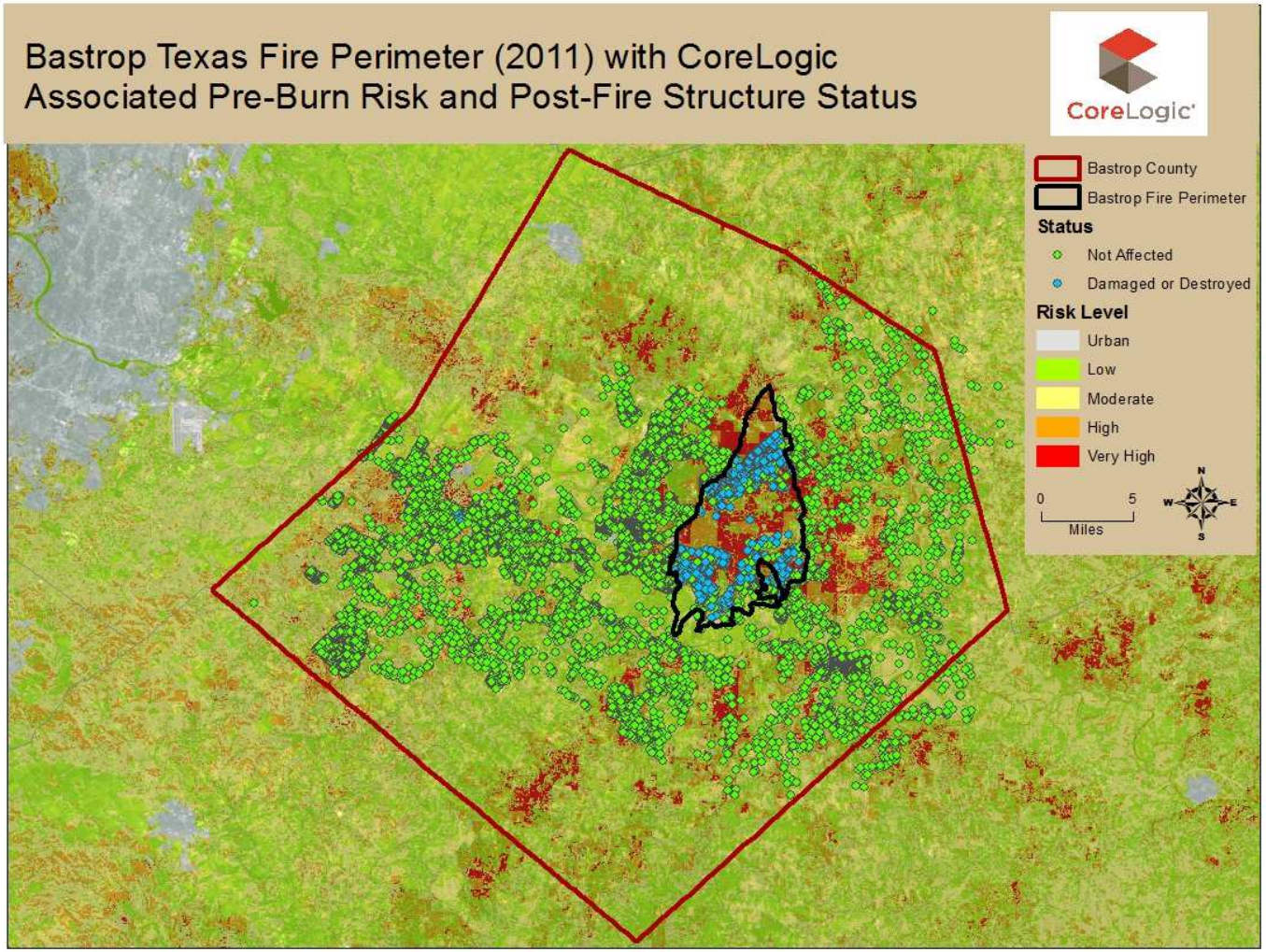
Risk Level	USA Land Mass Area	F2 & above Events
Very Low	42.8%	4.3%
Low	9.9%	3.4%
Moderate	7.3%	8.1%
High	10.4%	18.1%
Very High	14.3%	37.3%
Extreme	15.3%	28.9%



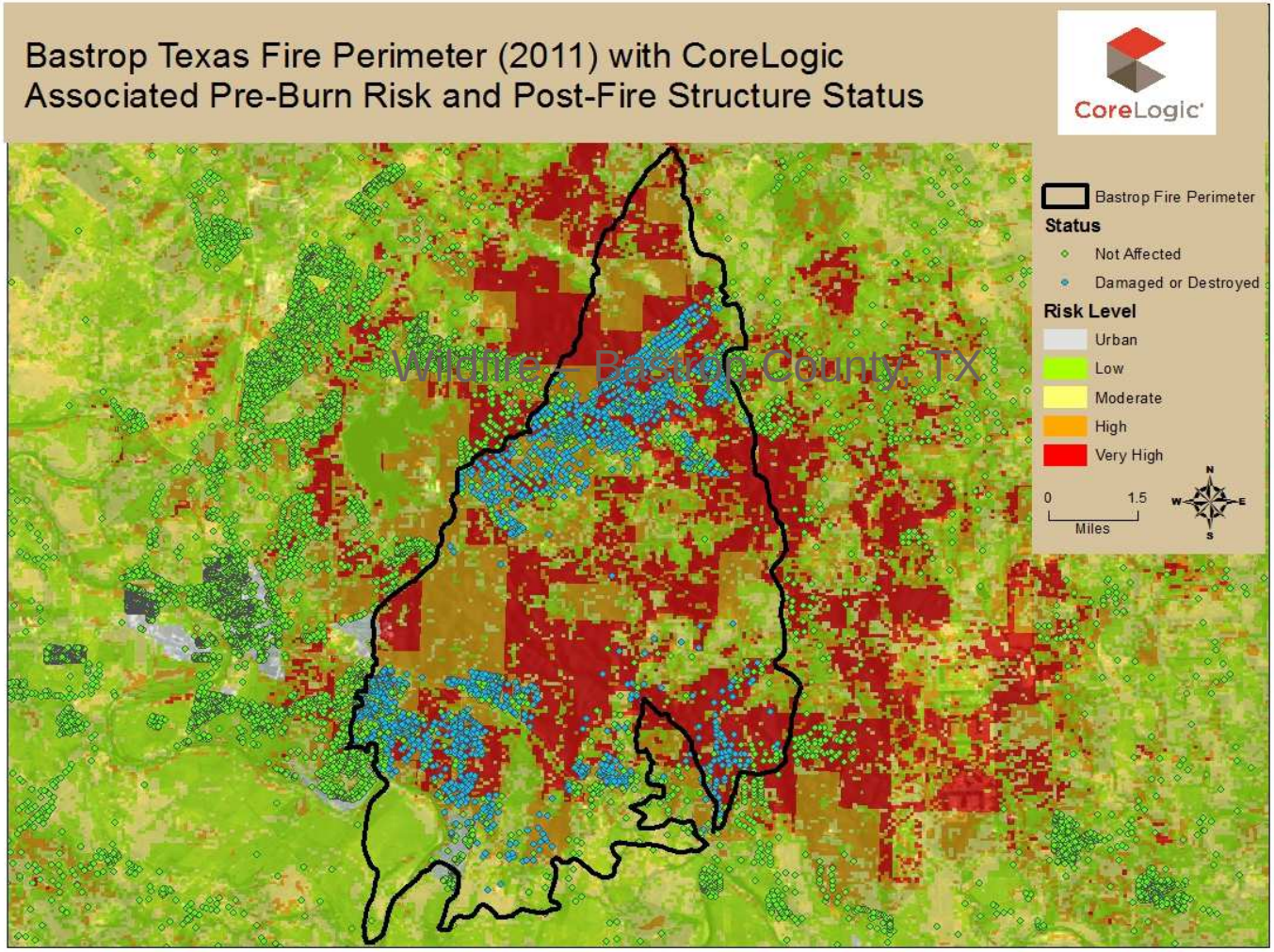
Overview - CoreLogic Wildfire Hazard Risk Report

- Drought conditions (only 5 states in the western U.S. recorded precipitation at or above average in 2012) and high temperatures impact the number of wildfires
- 67,664 Wildfires in 2012
- 9,326,000 acres burned in 2012
- For 2000-2008, on average over 2,500 structures destroyed each year, compared with less than 1,000 per year for all prior decades
- Over 1,260,000 residential properties in the western U.S are currently located in High or Very High Wildfire risk areas, with a value of more than $189 billion

Wildfire – Bastrop County, TX



Wildfire – Bastrop County, TX

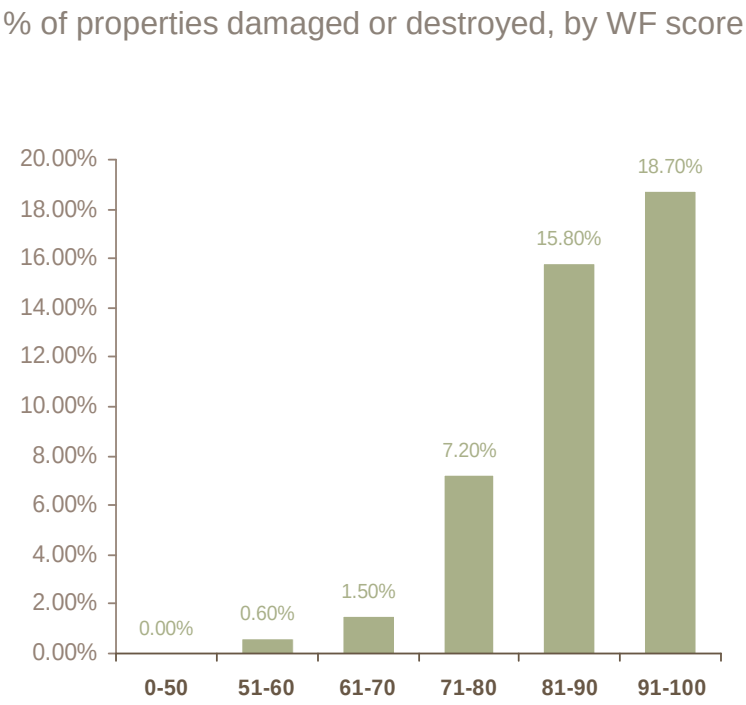


Wildfire – Bastrop County TX

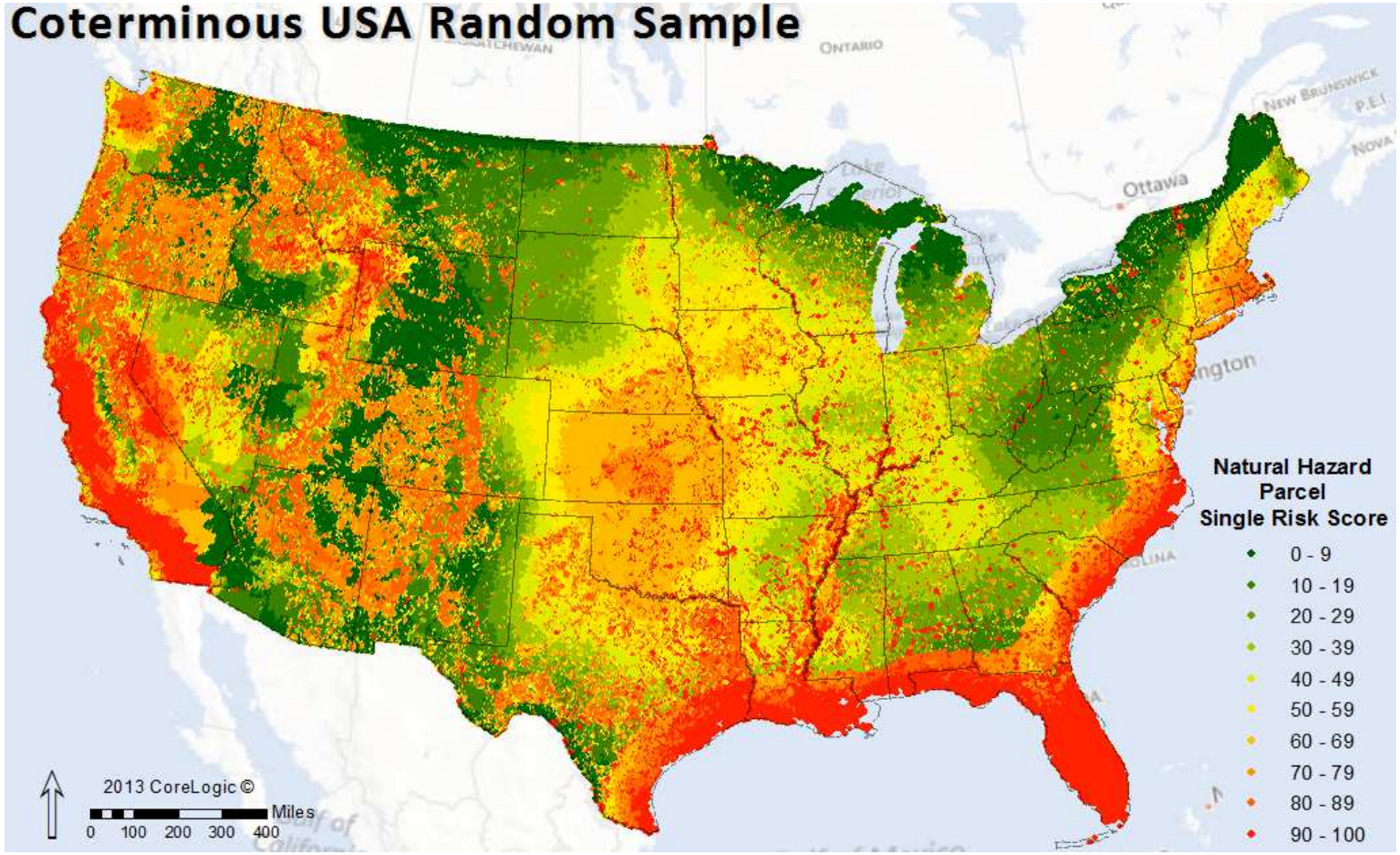
- % of properties damaged increases with Wildfire Risk Score
- Damage % varies across Very High Risk scores, but increasing

Wildfire Risk Score summary

WF Score	Total properties	% in group w/ damage
Scores 0-50	3,328	0.0%
scores 51-60	1,089	0.6%
scores 61-70	2,151	1.5%
scores 71-80	3,180	7.2%
scores 81-90	5,302	15.8%
scores 91-100	1,781	18.7%
Total	16,831	8.5%



Single Risk Score Summary



Summary

- The is an increasing number of events over the past decade
- Location of recent events seem to follow where the models predict they will occur
- Hail and Tornado damage extends and causes damage beyond just the traditional Tornado Alley